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			３６０Ｂ

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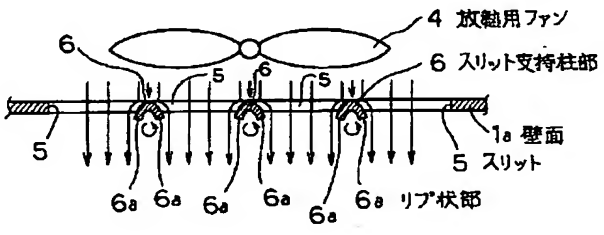
(54)【発明の名称】　電気機器

(57)【要約】

【課題】　騒音を低減させスリット支持柱部の強度を向上させる。

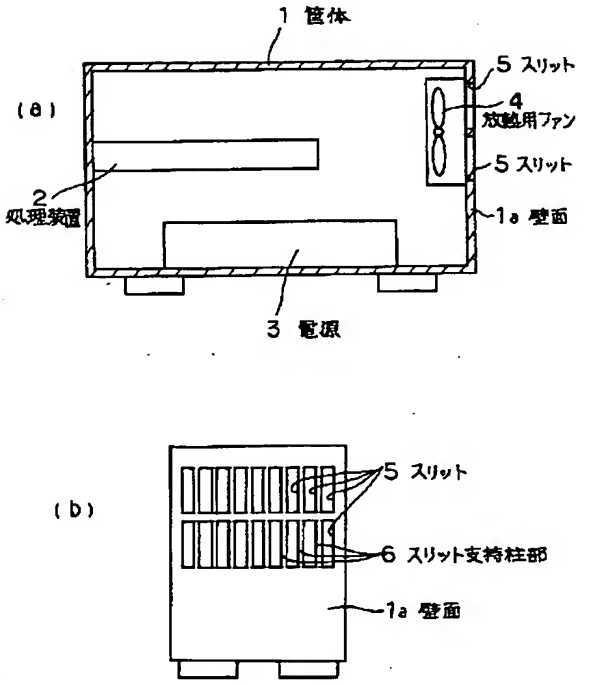
【解決手段】　電気機器の筐体内に、発熱する処理装置および電源と、これらの発熱による高温の空気を外部へ流し出すための放熱用ファン４が内蔵されている。筐体の壁面１ａには、放熱用ファン４に対向する位置に、細幅のスリット５が多数並べて形成されている。各スリット５間の間隙のスリット支持柱部６には曲げ加工が施されてリブ状部（補強加工部）６ａが設けられ、スリット支持柱部６は筐体１の内側に向かって凸の略円弧状に形成されている。放熱用ファン４による筐体１の内部から外部へ向かう気流は、リブ状部６ａに沿って円滑に流れ、風切り音等の騒音が低減する。また、スリット支持柱部６にリブ状部６ａが形成されているため、強度が向上している。



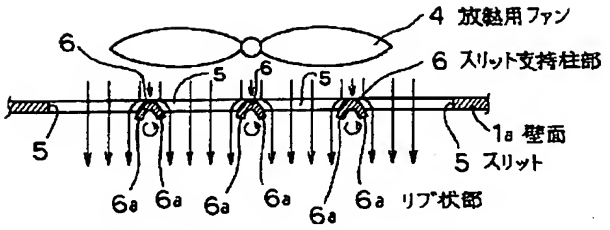
【特許請求の範囲】
【請求項１】　筐体内に内蔵されており発熱を伴う電気的処理を行なう処理装置と、前記筐体内に内蔵されている放熱用ファンと、前記筐体の壁面に形成されており、前記放熱用ファンによる前記筐体の内部と外部との空気の流通を許容する複数のスリットと、前記複数のスリットの間隙に設けられているスリット支持柱部とを有し、前記スリット支持柱部に、前記筐体の内部から外部への空気流を円滑にする形状の補強加工部が設けられている電気機器。
【請求項２】　前記補強加工部が、曲げ加工により形成されたリブ状部である請求項１に記載の電気機器。
【請求項３】　前記補強加工部により、前記スリット支持柱部が前記筐体の内側に向って凸の形状となっている請求項１または２に記載の電気機器。
【請求項４】　前記処理装置が情報処理を行なうものである請求項１～３のいずれか１項に記載の電気機器。
【請求項５】　前記放熱用ファンが、前記筐体の前記スリット形成面と前記処理装置との間に位置している請求項１～４のいずれか１項に記載の電気機器。
【請求項６】　前記筐体内に、前記処理装置に電力を供給する電源が設けられている請求項１～５のいずれか１項に記載の電気機器。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は情報処理装置等の電気機器に関する。
【０００２】
【従来の技術】従来、筐体内に電気的処理を行なう処理装置が内蔵された構成の電気機器においては、処理装置の作動に伴う発熱により筐体内が高温になり過ぎて様々な電気部品等の誤動作や動作不良を招かないように、熱を外部に逃す構成が採用されている。その代表的なものとしては、筐体内に放熱用ファンを設け、処理装置付近の高温の空気を外部へ流し出す構成が一般的である。この場合、筐体内部の高温の空気を外部に流し出すために、筐体の壁面に空気流通用のスリットが設けられる。
【０００３】ところで、筐体内部に使用者が誤って手などを差し入れると、作動中の放熱用フィンに触れて指などを傷つけたり、高温になっている処理装置などの部品に触れて火傷を負ったりするおそれがある。また、筐体内部に埃や塵等が侵入すると、各電気部品の動作不良の原因となるおそれもある。そこで、前記した空気流通用のスリットの幅は、人の指や埃や塵が入りにくい程度の細さに形成されている。そして、このようなスリットを数多く形成することによって、空気の流通に十分な開口を得ている。
【０００４】
【発明が解決しようとする課題】従来の電気機器において、前記の通り、筐体の壁面１５には、内外の空気の流通のために多数のスリット１１が並べて設けられているので、各スリット１１間にはスリット支持柱部１２が設けられている。図３には、スリット１１およびスリット支持柱部１２の断面図が示されている。スリット１１は、金属板である筐体の壁面１５にプレス打ち抜き加工を施して形成されている。これによると、スリット支持柱部１２が、放熱用ファン１３による空気の流れに対して直角に位置する抵抗となり、流れを乱しカルマン渦が発生したりする。それに伴って、風切り音などの騒音が大きくなる。また、プレス打ち抜き加工により形成された薄い平板状のスリット支持柱部１２の強度が弱いという問題がある。
【０００５】また、図４に示すように、筐体の壁面１７には大面積の孔部１６を形成しておき、その孔部１６を塞ぐように金属製の格子状のフィンガーガード１８が取り付けられた構成もある。この場合は、フィンガーガード１８の格子の隙間（スリット１９）から空気が流通するが、部品増加によるコストアップと、フィンガーガード１８の取付工程が追加されるため、製造工程が煩雑になるという問題がある。
【０００６】そこで本発明の目的は、コストアップや製造工程の煩雑化を招くことなく、騒音の低減とスリット支持柱部の強度向上とが可能な電気機器を提供することにある。
【０００７】
【課題を解決するための手段】本発明の電気機器の特徴は、筐体内に内蔵されており発熱を伴う電気的処理を行なう処理装置と、前記筐体内に内蔵されている放熱用ファンと、前記筐体の壁面に形成されており、前記放熱用ファンによる前記筐体の内部と外部との空気の流通を許容する複数のスリットと、前記複数のスリットの間隙に設けられているスリット支持柱部とを有し、前記スリット支持柱部に、前記筐体の内部から外部への空気流を円滑にする形状の補強加工部が設けられているところにある。
【０００８】前記補強加工部が、曲げ加工により形成されたリブ状部であってもよい。
【０００９】また、前記補強加工部により、前記スリット支持柱部が前記筐体の内側に向って凸の形状となっていることが好ましい。
【００１０】前記処理装置が情報処理を行なうものであってもよい。
【００１１】前記放熱用ファンが、前記筐体の前記スリット形成面と前記処理装置との間に位置していることが好ましい。
【００１２】前記筐体内に、前記処理装置に電力を供給する電源が設けられていてもよい。
【００１３】このような構成によると、スリット支持柱部の気流に対する抵抗が小さくなるとともに、補強加工部によりスリット支持柱部の強度が向上している。

【００１４】
【発明の実施の形態】以下、図面を参照して本発明の実施形態について説明する。
【００１５】図１（ａ）に本実施形態の電気機器の全体を概略的に示している。本実施形態の電気機器は、コンピュータ等の情報処理装置であり、金属製の箱状の筐体１の内部に、処理装置２と電源３と放熱用ファン４が配設されている。処理装置２は、詳述しないが、ＩＣチップ、ＬＳＩパッケージ、高圧トランス、ディスクドライブ等を含む各種電気部品を総称したものであり、作動中に熱を発する場合がある。電源３は、処理装置２の駆動源であり、やはり熱を発する場合がある。放熱用ファン４は、発熱する可能性のある処理装置２および電源３に対向するように、かつ筐体１の壁面１ａに近い位置に配置されており、回転時に処理装置２および電源３から壁面１ａに向かう気流を起こす。
【００１６】図１（ｂ）は壁面１ａの正面図である。壁面１ａには、放熱用ファン４に対向する位置に、細幅のスリット５が多数並べて形成されている。そして、このスリット５とスリット５との間隙がスリット支持柱部６となっている。図２には、このスリット５およびスリット支持柱部６形成部の断面が示されている。各スリット５の幅は、通常、人間の指が挿通し得ない程度の細さである。スリット５は、金属板である壁面１ａにプレス打ち抜き加工を施すことにより形成されており、このプレス打ち抜き加工により残った部分がスリット支持柱部６である。そして、スリット支持柱部６に曲げ加工が施されてリブ状部（補強加工部）６ａが設けられて、スリット支持柱部６は筐体１の内側に向かって凸の略円弧状に形成されている。
【００１７】本実施形態では、電源３から電力が供給されて処理装置２が情報処理等の電気的処理を行なう際に、やはり電源３から電力が供給されて放熱用ファン４が回転する。放熱用ファン４が回転すると、筐体１の内部から外部へ向かう気流が発生し、処理装置２および電源３付近の高温の空気が、スリット５を通って外部へ流し出されることにより、筐体１内部が冷却される。このように、放熱用ファン４の作動時にスリット５を通る気流が発生すると、図２に示すように、リブ状部６ａに沿って円滑に空気が流れ、カルマン渦の発生が少なく抑えられ、気流の乱れが小さい。リブ状部６ａを有することによりスリット支持柱部６の気流に対する抵抗が小さくなっているため、空気が通過する際の風切り音等の騒音が低減する。また、スリット支持柱部６が、プレス打ち抜きしただけの薄い平板状である場合に比べて、曲げ加工によりリブ状部６ａが形成されていることにより、強度が向上している。
【００１８】なお、本発明における電気機器とは、電力が供給されて何らかの動作や処理を行なう装置全てを広く含むものであり、コンピュータ等の情報処理装置に限られず、家電製品や電子機器等も本発明の対象となる。そして、処理装置２とは、前記した電気機器において何らかの動作や処理を行なうための電気部品全てを広く含むものであり、その種類や構造等は特に限定されるものではない。
【００１９】
【発明の効果】本発明によると、補強加工部が設けられているために、放熱ファンの作動による気流に対するスリット支持柱部の抵抗が小さくなっている。それによって、空気がスリットを通過する際の風切り音等の騒音が低減する。また、補強加工部により、スリット支持柱部の強度が向上している。
【図面の簡単な説明】
【図１】（ａ）は本発明の第１の実施形態の電気機器を示す概略断面図、（ｂ）はその壁面の正面図である。
【図２】図１（ａ）に示す壁面の拡大断面図である。
【図３】第１の従来例の壁面の拡大断面図である。
【図４】第２の従来例の壁面の拡大断面図である。
【符号の説明】
１　筐体
１ａ　壁面
２　処理装置
３　電源
４　放熱用ファン
５　スリット
６　スリット支持柱部
６ａ　リブ状部（補強加工部）
１１　スリット
１２　スリット支持柱
１３　放熱用ファン
１５　壁面
１６　孔部
１７　壁面
１８　フィンガーガード
１９　スリット

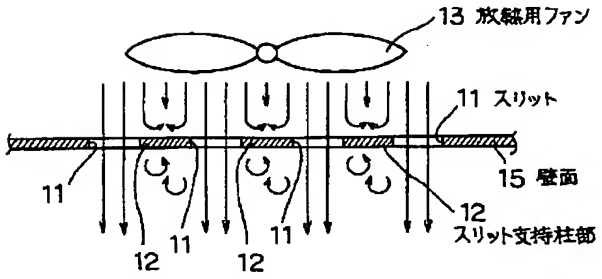
【図１】


1 筐体
5 スリット
4
放熱用ファン
5 スリット
2
処理装置
1a 壁面
3 電源
(a)
(b)
5 スリット
6 スリット支持柱部
1a 壁面

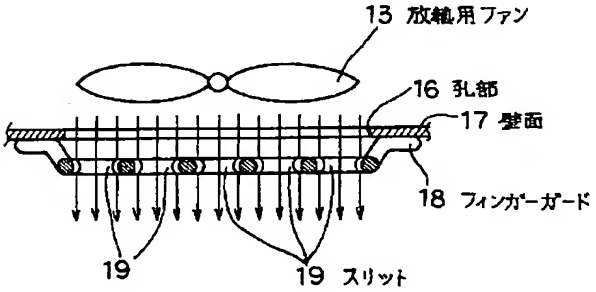
【図２】


4 放熱用ファン
6
6 スリット支持柱部
5
6
5
1a 壁面
5
5 スリット
6a
6a
6a
6a
6a
6a リブ状部

【図３】


13 放熱用ファン
11 スリット
15 壁面
11
12
11
12
11
12
スリット支持柱部

【図４】


13 放熱用ファン
16 孔部
17 壁面
18 フィンガーガード
19
19 スリット

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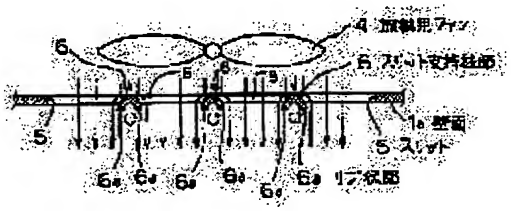
(22)Date of filing : 10.06.1998

(71)Applicant : NEC CORP
(72)Inventor : SAWADA YOZO

(54) ELECTRIC APPARATUS

(57)Abstract:
PROBLEM TO BE SOLVED: To enhance strength at a slit supporting pole part while reducing noise.
SOLUTION: A processor generating heat, a power supply and a heat dissipation fan 4 for discharging high temperature air are contained in the housing of an electric apparatus. A large number of thin slits 5 are made, side by side, in the wall face 1a of the housing while facing the heat dissipation fan 4. A slit supporting pole part 6 is bent and provided with a rib part (reinforcing part) 6a in the gap between respective slits 5 and the slit supporting pole part 6 is projected substantially arcuately toward the inside of the housing 1. Air flow from the heat dissipation fan 4 flows smoothly along the rib part 6a from the inside toward the outside of the housing 1 and noise, e.g. air cutting noise, is reduced. Furthermore, strength is improved because the rib parts 6a are formed on the slit supporting pole part 6.



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[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of r jection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

* NOTICES *

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3.In the drawings, any words are not translated.

Bibliography

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G06F 1/20
G11B 33/14 503

[FI]

H05K 7/20 H
G11B 33/14 503 A
G06F 1/00 360 C
360 B

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[Number of Pages] 4
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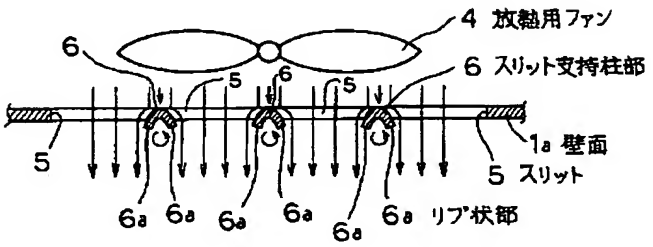
Summary

(57) [Abstract]
[Technical problem] Noise is reduced and the intensity of a slit support pillar section is raised.
[Means for Solution] In the case of an electrical machinery and apparatus, the fan 4 for heat dissipation for beginning to pass the processor and power supply generating heat, and the hot air by these generation of heat to the exterior is built in. The slit 5 of a narrow width arranges a large number in wall surface 1a of a case, and is formed in the position which counters the fan 4 for heat dissipation at it. Bending is performed to the slit support pillar section 6 of the gap between each slit 5, rib-like section (reinforcement processing section) 6a is prepared, and the slit support pillar section 6 is formed in the approximate circle arc of a convex toward the inside of a case 1. The air current which goes to the internal shell exterior of the case 1 by the fan 4 for heat dissipation flows smoothly along with rib-like section 6a, and noise, such as a whizzing sound, reduces it. Moreover, since rib-like section 6a is formed in the slit support pillar section 6, intensity is improving.

[Translation done.]



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CLAIMS

[Claim(s)]
[Claim 1] The electrical machinery and apparatus characterized by providing the following The processor which is built in in the case and performs electrical treatment accompanied by generation of heat The fan for heat dissipation built in in the aforementioned case Two or more slits which are formed in the wall surface of the aforementioned case and permit circulation of

the air of the interior of the aforementioned case and the exterior by the aforementioned fan for heat dissipation The reinforcement processing section of the configuration which has the slit support pillar section prepared in the gap of two or more aforementioned slits, and makes smooth the airstream to the internal shell exterior of the aforementioned case at the aforementioned slit support pillar section
[Claim 2] The electrical machinery and apparatus according to claim 1 whose aforementioned reinforcement processing section is the rib-like section formed of bending.
[Claim 3] The electrical machinery and apparatus according to claim 1 or 2 from which the aforementioned slit support pillar section serves as a configuration of a convex toward the inside of the aforementioned case by the aforementioned reinforcement processing section.
[Claim 4] An electrical machinery and apparatus given in any 1 term of the claims 1-3 which are those to which the aforementioned processor processes information.
[Claim 5] An electrical machinery and apparatus given in any 1 term of the claims 1-4 to which the aforementioned fan for heat dissipation is located between the aforementioned slit forming face of the aforementioned case, and the aforementioned processor.
[Claim 6] An electrical machinery and apparatus given in any 1 term of the claims 1-5 by which the power supply which supplies power to the aforementioned processor is prepared in the aforementioned case.

[Translation done.]

* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to electrical machinery and apparatus, such as an information processor.
[0002]
[Description of the Prior Art] In the electrical machinery and apparatus of composition of that the processor which performs electrical treatment was conventionally built in in the case, the composition which misses heat outside is adopted so that the inside of a case may become an elevated temperature too much by generation of heat accompanying the operation of a processor and malfunctions or malfunctions, such as various electrical parts, may not be caused. The composition which prepares the fan for thermolysis in a case and begins to pass the hot air near a processor to the exterior as the typical thing is common. In this case, in order to begin to pass the hot air inside a case outside, the slit of airstream popular use on the wall surface of a case is prepared.
[0003] By the way, when a user inserts a hand etc. into the interior of a case accidentally, the fin for heat dissipation under operation is touched, and there is a possibility of damaging a finger etc., or touching parts, such as a processor which has an elevated temperature, and getting injured. Moreover, when dust, dust, etc. trespass upon the interior of a case, there is also a possibility of becoming the cause of the malfunction of each electrical part. Then, the width of

face of said slit of airstream popular use is formed in the thinness of a grade into which people's finger, dust, or dust cannot go easily. And sufficient opening for circulation of air has been obtained by forming many of such slits.
[0004]
[Problem(s) to be Solved by the Invention] In the conventional electrical machinery and apparatus, since many slits 11 are put in order and formed in the wall surface 15 of a case for circulation of internal and external air as aforementioned, the slit support pillar section 12 is formed between each slit 11. The cross section of a slit 11 and the slit support pillar section 12 is shown in drawing 3 . A slit 11 gives press punching processing to the wall surface 15 of the case which is a metal plate, and is formed in it. According to this, it becomes the resistance in which the slit support pillar section 12 is located right-angled to the flow of the air by the fan 13 for heat dissipation, a flow is disturbed, and a Karman's vortex occurs. In connection with it, noise, such as a whizzing sound, becomes large. Moreover, there is a problem that the intensity of the thin plate-like slit support pillar section 12 formed of press punching processing is weak.
[0005] Moreover, as shown in drawing 4 , the pore 16 of a large area is formed in the wall surface 17 of a case, and there is also composition in which the finger guard 18 of the shape of a metal grid was attached so that the pore 16 might be closed. In this case, although air circulates from the crevice between the grids of the finger guard 18 (slit 19), since it is added like the cost rise by the increase in parts, and the shipfitter of the finger guard 18, there is a problem that a manufacturing process becomes complicated.
[0006] Then, the purpose of this invention is to offer the electrical machinery and apparatus in which reduction of noise and the improvement in on the strength of a slit support pillar section are possible, without causing a cost rise and complicated-ization of a manufacturing process.
[0007]
[Means for Solving the Problem] The processor which the feature of the electrical machinery and apparatus of this invention is built in in the case, and performs electrical treatment accompanied by generation of heat, Two or more slits which are formed in the wall surface of the aforementioned case with the fan for heat dissipation built in in the aforementioned case, and permit circulation of the air of the interior of the aforementioned case and the exterior by the aforementioned fan for heat dissipation, It has the slit support pillar section prepared in the gap of two or more aforementioned slits, and is in the place where the reinforcement processing section of the configuration which makes smooth the airstream to the internal shell exterior of the aforementioned case is prepared in the aforementioned slit support pillar section.
[0008] The aforementioned reinforcement processing section may be the rib-like section formed of bending.
[0009] Moreover, it is desirable that the aforementioned slit support pillar section serves as a configuration of a convex toward the inside of the aforementioned case by the aforementioned reinforcement processing section.
[0010] The aforementioned processor may process information.
[0011] It is desirable that the aforementioned fan for heat dissipation is located between the aforementioned slit forming face of the aforementioned case and the aforementioned processor.
[0012] In the aforementioned case, the power supply which supplies power to the aforementioned processor may be prepared.
[0013] According to such composition, while the resistance to the air current of a slit support pillar section becomes small, the intensity of a slit support pillar section is improving by the reinforcement processing section.
[0014]
[Embodiments of the Invention] Hereafter, the operation form of this invention is explained with reference to a drawing.
[0015] The whole electrical machinery and apparatus of this operation form is roughly shown in drawing 1 (a). The electrical machinery and apparatus of this operation form are information processors, such as a computer, and the processor 2, the power supply 3, and the fan 4 for heat dissipation are arranged in the interior of the metal box-like case 1. Although a processor 2 is not explained in full detail, it may name generically the various electrical parts containing IC chip,

an LSI package, a high-pressure transformer, a disk drive, etc., and may emit heat during an operation. A power supply 3 is a driving source of a processor 2, and may emit heat too. The fan 4 for heat dissipation is stationed in the position near wall surface 1a of a case 1, and causes the air current which goes to wall surface 1a from a processor 2 and a power supply 3 at the time of rotation so that the processor 2 and power supply 3 which may generate heat may be countered.
[0016] Drawing 1 (b) is the front view of wall surface 1a. The slit 5 of a narrow width arranges a large number in wall surface 1a, and is formed in the position which counters the fan 4 for heat dissipation at it. And the gap of this slit 5 and slit 5 serves as the slit support pillar section 6. The cross section of this slit 5 and the slit support pillar section 6 formation section is shown in drawing 2 . The width of face of each slit 5 is thinness which is usually the grade which human being's finger cannot insert in. The slit 5 is formed by giving press punching processing to wall surface 1a which is a metal plate, and the portion which remained by this press punching processing is the slit support pillar section 6. And bending is performed to the slit support pillar section 6, rib-like section (reinforcement processing section) 6a is prepared, and the slit support pillar section 6 is formed in the approximate circle arc of a convex toward the inside of a case 1.

[0017] With this operation gestalt, in case power is supplied from a power supply 3 and a processor 2 performs electrical treatment, such as information processing, power is too supplied from a power supply 3, and the fan 4 for thermolysis rotates. If the fan 4 for thermolysis rotates, the air current which goes to the internal shell exterior of a case 1 will occur, and the case 1 interior will be cooled by beginning to pass the hot air of a processor 2 and the power supply 3 neighborhood through a slit 5 outside. Thus, when the air current which passes along a slit 5 at the time of an operation of the fan 4 for thermolysis occurs, as shown in drawing 2 , along with rib-like section 6a, air flows smoothly, generating of a Karman's vortex is suppressed few, and disorder of an air current is small. Since the resistance to the air current of the slit support pillar section 6 is small by having rib-like section 6a, noise, such as a whizzing sound at the time of air passing, decreases. Moreover, compared with the case where the slit support pillar section 6 is plate-like [which carried out press punching / thin], when rib-like section 6a is formed of bending, intensity is improving.
[0018] In addition, widely, it is not restricted to information processors, such as a computer, excluding all the equipments with which power is supplied and the electrical machinery and apparatus in this invention performs a certain operation and processing, but home electronics, electronic equipment, etc. are set as the object of this invention. And especially the kind, structure, etc. are not limited, excluding widely all the electrical parts for performing a certain operation and processing in the electrical machinery and apparatus described above as the processor 2.
[0019]
[Effect of the Invention] According to this invention, since the reinforcement processing section is prepared, resistance of the slit support pillar section to the air current by a heat dissipation fan's operation is small. By it, noise, such as a whizzing sound at the time of air passing a slit, decreases. Moreover, the intensity of a slit support pillar section is improving by the reinforcement processing section.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The outline cross section in which (a) shows the electrical machinery and apparatus of the 1st operation gestalt of this invention, and (b) are the front view of the wall surface.
[Drawing 2] It is the expanded sectional view of the wall surface shown in drawing 1 (a).
[Drawing 3] It is the expanded sectional view of the wall surface of the 1st conventional example.

[Drawing 4] It is the expanded sectional view of the wall surface of the 2nd conventional example.
[Description of Notations]
1 Case
1a Wall surface
2 Processor
3 Power Supply
4 Fan for Heat Dissipation
5 Slit
6 Slit Support Pillar Section
6a Rib-like section (reinforcement processing section)
11 Slit
12 Slit Support Pillar
13 Fan for Heat Dissipation
15 Wall Surface
16 Pore
17 Wall Surface
18 Finger Guard
19 Slit

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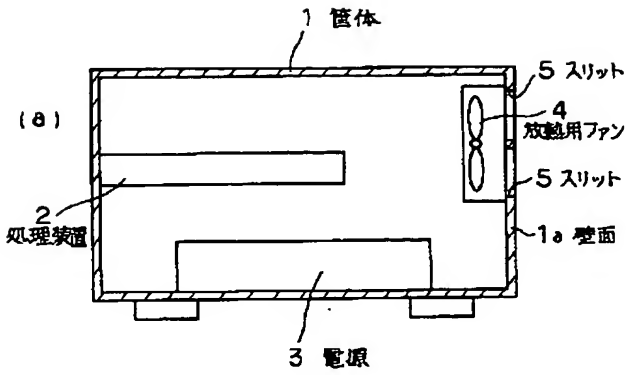
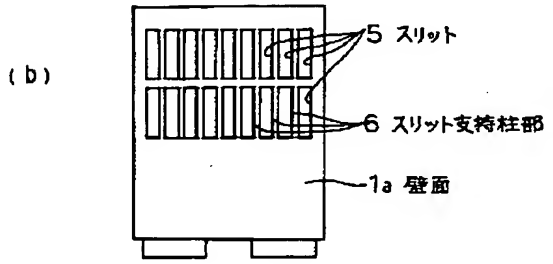
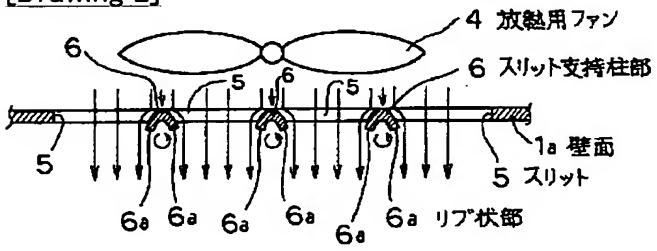
DRAWINGS

[Drawing 1]

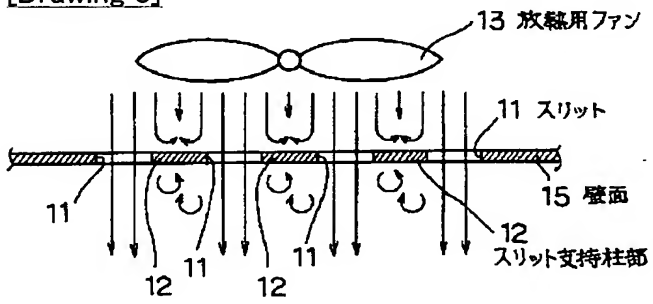




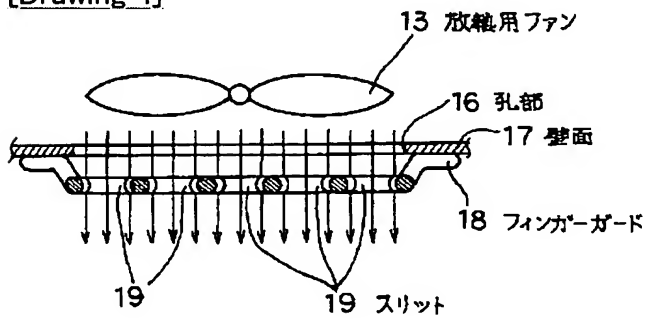
[Drawing 2]



[Drawing 3]



[Drawing 4]



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